BODY AND EMOTION

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Introduction

Emotional consciousness, broadly construed, includes occurrent emotions, less focused emotional states (moods), long-standing emotions, background “existential orientations” (Ratcliffe, 2008), and particularly stable emotional tendencies (character traits). These modes of emotional consciousness are how minded persons like us care (Frankfurt, 1988), and all should be understood as essentially embodied, enactive appraisals. When I say that emotions are essentially embodied, what I mean is that the living body and its corresponding neurobiological dynamics play a constitutive rather than a merely causal role in emotional experience. And when I say that emotions are enactive, what I mean is that they are ways of engaging with and making sense of the world.

While other embodied appraisal accounts of emotion imply that emotional intentionality generates neurobiological processes that are distinguishable and separable from associated feelings, my account says that the bodily changes and affectivity that emotions involve (their feeling component) cannot be separated from their element of appraisal (their evaluative component). Indeed, insofar as bodily feelings play a key role in generating meaning, appraisal and bodily processes are constitutively interdependent (Colombetti, 2007, p. 543). Once appraisal is understood as distributed over a complex network of brain and bodily processes, and as thoroughly corporeal, emotion then can be characterized as a sense-making faculty of the whole embodied and situated organism (Colombetti, 2011). This active, dynamic, fully embodied process of appraisal is what I call “affective framing.”

What implications does this conception of emotion have for traditional cognitive science? It appears that emotion and our immediate capacity for detecting relevance and value is “physically grounded” in our bodily form, structure, neurobiological dynamics, and the fact that the human body as a whole is an autonomous, autopoietic system. Moreover, the detection of relevance involved in affective framing appears to be non-deliberative and non-algorithmic and to require bodily attunement and habitual patterns of bodily response. This hypothesis challenges classical cognitive science, which holds that it is possible to formulate abstract, “explicitly specifiable rules of thought” that govern the move from one cognitive state to another (Anderson, 2003, p. 94).
Essentially embodied emotions

Emotions can serve as privileged tools in the attempt to integrate the mind and body, both because they are simultaneously mental and bodily, and also because the body occupies a central place in an adequate account of emotional experience (Colombetti, 2007, p. 529). Recent work on the neurochemistry of human emotions strongly suggests that the vital systems centrally causally involved with and embodying our basic emotions are gut-based and not rooted in the brain alone.\(^1\) Anger, for example, clearly is embodied in facial and postural changes, as well as in readiness activation, and also in complex autonomic physiological changes, including skin conductance, cardiopulmonary changes, and musculoskeletal changes (Varela and Depraz, 2005, p. 68). Emotional experience is closely bound up with feelings of various bodily changes, including racing hearts, quickened breathing, grimacing faces, tensing muscles, tingling skin, and sweating palms. These feelings often are not clearly localizable, but are instead diffusely spread out and lived in and through one’s body as a whole. In the midst of emotional experience, we often are literally “moved” or “shaken” (Slaby, 2007, p. 432).

Of course, the claim that emotions are causally dependent on the body is fairly uncontroversial. My thesis, on the other hand, is more radical: emotional consciousness is constitutively dependent on our living bodies. This is because crucial structural aspects of emotion are physically grounded in the autopoietic processes and neurobiological dynamics of living organisms. The term “autopoiesis” was coined by Francisco Varela and Humberto Maturana in 1971. Influenced by philosophers such as Heidegger, Husserl, and Merleau-Ponty, these theorists sought to explore the biological basis of consciousness. In simplest terms, autopoiesis is the process whereby the constituent processes of living systems “produce the components necessary for the continuance of those same processes” (Thompson, 2007, p. 98). An autopoietic unit is a system that is capable of sustaining itself due to an inner network of reactions that regenerate the system’s components. Thanks to its metabolic network, a cell continually replaces the components that are being destroyed, including its membrane, which in turn produces its own components, in an ongoing circular process. Although autopoiesis initially was limited to cells, Thompson’s (2007) work explores how higher forms of life are autonomous agents that actively generate and maintain their own coherent patterns of activity. These thermodynamically far-from-equilibrium systems exchange matter and energy with their surroundings so as to regulate and control themselves. The constituent processes in such systems (a) recursively depend on each other for their generation and realization as a network, (b) constitute the system as a unity, and (c) determine a possible range of interactions with the environment (Thompson, 2007, p. 44).

Because a living organism always has to make sense of the world and supplement the autopoietic process with what it lacks in order to remain viable, stimuli acquire meaning to the extent that they relate positively or negatively to the “norm of the maintenance of the organism’s integrity” (p. 70). A norm of maintenance can be understood as an organism’s optimal conditions of activity and its proper manner of realizing equilibrium within its environment. Adaptivity is a matter of being tolerant to changes by actively monitoring perturbations and compensating for them (p. 147).

Key structural features of emotion are physically grounded in the autopoietic identity, self-maintenance, and adaptive sense-making of living beings. First, emotions are characterized by conative affectivity, which might be understood as the “experiential” aspect of consciousness, or what some theorists have described as “qualitative feel.” Affectivity is linked to a creature’s valenced bodily feelings or felt needs, whether real or merely imagined, and those felt needs help constitute “what-it-is-like-to-be” that creature. Varela and Depraz (2005) describe valence as “the primordial constitution of self-affection as a dynamic polarity, as manifesting itself in the
form of a tension that takes several forms: like-dislike, attraction-rejection, pleasure-displeasure” (p. 70). No doubt emotions are prime examples of experiential states that are phenomenologically salient, hedonically valenced, and bound up with bodily feelings of pleasure and displeasure. While anger involves the sense that one’s felt needs have been violated, joy involves the sense that one’s desires have been fulfilled. Insofar as the primary condition of life is one of want, conative affectivity arises at a basic level out of vital significance, which is rooted in biological autonomy. The constant regenerative activity of metabolism endows life with a minimal “concern” to go on living, so that the environment becomes a place of attraction or repulsion. Spinoza called this concern conatus, which he understood as the effort and power of life to preserve itself (Thompson, 2007, p. 155).

Emotions also are egocentrically structured in the sense that they are a matter of relating things in one’s surroundings to an inner source-point. Egocentricity can be understood in relation to the subject-object status of the body, whereby the body serves as both the source and target of affection. The body functions as the “zero point” in relation to which objects of perception are situated and take on meaning, and from which action proceeds, so that the ego is located wherever the body is located. In cases of anger, for example, it is in relation to me and my own vantage point that objects or events appear as violations of felt needs and as “offenses” against me or someone I care about; and it is I who have been involuntarily provoked and must deal with or correct the situation. This sense of one’s body as the “ego-pole” or “zero point” (Thompson, 2007, p. 29) for conscious experience is grounded in one’s living bodily dynamics. Autopoiesis entails the production and maintenance of a dynamic identity (a bodily self) in the face of material change in the environment. Autonomous systems endogenously create and maintain the constraints that modulate the constitutive processes of the system, and thereby produce their own boundary. The origin of life itself can be understood as “the transition from a chemical environment to a self-produced identity which can give a point of view that is the very origin of sense and meaning” (Varela and Depraz, 2005, p. 72). In an effort to go on living, an adapting, self-sustaining organism establishes a pole of internal identity in relation to a pole of an outside world.

The egocentric frame of reference involved in emotion also is a spatial frame of reference. Importantly, this spatial framework does not correspond precisely to objective measurements, but instead is a body-centered, perspectival framework in which the body functions as an indexical “here.” Objects are perceptually situated and positioned, either to facilitate or to thwart my desires, by virtue of their orientation in relation to my body. In anger, I experience myself as uniquely located, or uniquely positioned; and even though my anger often is directed toward things in the world, it radiates out from my body, so that my anger always is experienced here. The living body not only takes a single path through space, but also serves as the spatial point of origin for all emotional experience. This too comes about through autopoiesis and the self-production of a boundary between inner and outer. Autopoietic organization is characterized by “a peculiar circular interdependency between an interconnected web of self-generating processes and the self-production of a boundary, such that the whole system persists in continuous self-production as a spatially distinct individual” (Thompson, 2007, p. 101). This boundary is not simply a container for its constituent processes, but also is itself produced and maintained by those very processes. This spatial individuation establishes the organism as a unity in space, which is part of what it means to be an autonomous system whose concern is survival.

Emotional consciousness also is necessarily temporal. Caring about things always involves a sense of being anchored in the past, situated in the present, and looking toward the future. Anger, for example, has the “retention-primal impression-protention” structure that has been explored so extensively by phenomenologists. In primal impression, the conscious subject is
affected; retention holds on to past, elapsed phases of experience; and protention describes how emotional consciousness is directed forward in time. In anger, one experiences oneself as embedded in time in relation to the past (when an offense occurred) and the future (when one may avenge oneself). The flow of emotional experience is rooted in one’s interests and desires, forward moving, and motivationally structured (p. 362). This necessary temporality of emotional consciousness emerges out of the dynamics of autopoietic systems. At a basic biological level, metabolism propels life beyond its present condition and toward a future time when the organism’s needs might be satisfied. At a higher level, among living animals, this temporal orientation is bound up with the capacity for movement. The emergence of the living present is rooted partly in “motion dispositions” (e.g. facial expressions, gestures, and autonomic components), which signify readiness for action (Varela and Depraz, 2005, p. 69). Even more clearly, this forward trajectory manifests as the “I can” in motor intentionality. Part of the experience of the “flow of action” is a sense that one’s situation deviates from some optimal body-environment relationship, and that one’s intentional activity will take one closer to that optimum. The forward-looking and forward-moving behaviors of living animals thus serve as an expression of life’s immanent purposiveness (Thompson, 2007, p. 362).

Now, all of these structures of emotional experience are interrelated, and all are bound up with what it means to care. Experiencing oneself as an inner source-point that both makes its mark on and is impacted by the world requires that one be invested in one’s well-being and survival; and experiencing oneself as located in space and oriented toward future possibilities presupposes a basic level of concern about oneself. Insofar as these structures of emotional consciousness are rooted in a conative, biological impulse to regenerate and go on living, the autopoietic and metabolic processes of living organisms serve as the basic ingredients of the “natural matrix” of emotion. Of course, this is not to say that autopoiesis or the basic biological dynamics of living organisms on their own entail the emergence of full-blown emotions. Instead, these dynamics lay the foundation for emotional experience.

**Embodied, enactive appraisal**

One structural feature of emotion that I have not yet mentioned is their intentionality. Intentionality commonly is characterized either as the ability of consciousness to direct itself at or towards objects, actions, events, or itself (intentional targets), or else as the fact that conscious mental states are “about” something or another. Here I adopt the classical phenomenological view of intentionality (common to the work of Brentano, Husserl, early Heidegger, early Sartre, and Merleau-Ponty) which says that all intentionality necessarily involves (i) mental episodes (acts or states); (ii) mental topics or objects; and (iii) shareable mental ways of representing those objects, or contents. In my view, not all intentionality involves determinate or explicit content, though all intentionality does involve directedness.

Theorists often characterize the intentionality of emotion in terms of appraisal. Much of emotion theory assumes that such appraisal takes place in the head, and that bodily events and arousal count simply as an “objective index of emotion” rather than as a process of lived bodily experience (Colombetti, 2007, p. 529). Classical cognitivist theories, for example, hold that emotions are nothing but certain kinds of belief-desire pairs or evaluative judgments. However, given that someone can experience an emotion without any sort of corresponding belief, it is a mistake to think that the intentional content of emotion must be understood as the content of a judgment or as the object of a propositional attitude. Because the intentionality of emotions is neither reducible to nor requires the intentionality of belief or thought, some theorists have argued that emotional intentionality has more in common with sense perception. Roberts
(1984), for example, proposes “construal” as an alternative to judgment; Doring (2003) recommends that we understand an emotion’s motivational force in terms of “affective perception”; and Goldie (2000) notes that while it is possible to recognize something as dangerous without feeling fear, there is a special affect-charged way of recognizing something as dangerous (“feeling-toward”) that does entail fear. The various quasi-perceptual accounts of emotion rightly acknowledge that emotions focus attention, and also that the content of an emotion need not be propositional. However, such accounts do not adequately address the body’s crucial role in appraisal.

The so-called embodied appraisal theories aim to provide an account of emotional intentionality in which the body does assume center stage. For example, in his later work, Solomon (2003) maintains that emotional experiences can be understood as intentional states directed towards the condition of one’s body. In his view, bodily events are by-products of appraisal, and do not contribute to the elicitation of the emotion. Similarly, according to Damasio’s (1994) somatic feeling theory, while the evaluative process is very much a part of the emotion, this process is separate from feeling. The evaluative process comes first, followed by a certain neurobiological state on which an emotion supervenes, and then a feeling. Sizer (2006) likewise suggests that emotion responses (changes in the body and brain) and emotional feelings (conscious experiences of emotion) are two distinct events, and that bodily changes involved in emotion can be separated from affectivity and feeling. Finally, while Solomon, Damasio, and Sizer all maintain that emotional intentionality comes first and is followed by bodily changes, Prinz’s (2004) embodied appraisal theory claims that bodily responses come first and then emotional intentionality comes along subsequently to monitor these bodily changes. In his view, emotions are not cognitive appraisals, but rather mental states that detect bodily changes, represent objects and events as having some bearing on one’s interests, and thereby track organism-environment relations.

Of course I welcome the proposal that emotions and embodiment are closely linked and that many emotions involve characteristic bodily changes. However, the different accounts of the appraisal-body relation outlined above would lead one to believe that emotional intentionality generates neurobiological processes that are separable from associated feelings, and that physiological processes have little or nothing to do with the experiential character of appraisal. By identifying emotional feelings with bodily symptoms or manifestations, these theories imply that feeling has at best a secondary role in emotional experience. However, to suppose that affective feeling is simply a matter of our awareness of bodily changes that occur after appraisal has taken place is to adopt a very narrow view of emotional feelings.

To devise an account that brings together the bodily nature of emotions with their world-directedness (Ratcliffe, 2008, p. 26) and makes sense of how appraisal and bodily feelings are constitutively interdependent, we must abandon a disembodied conception of cognition. This account should acknowledge that our capacity to understand our surroundings is essentially bodily and affective, and capture how the constitution of meaning involved in appraisal depends on the relationship between body and environment (Nonthoff, 2008, p. 72). Rather than being the object of conscious awareness, a particular bodily condition is lived through in the very process of evaluating one’s environment, so that emotions count as a bodily sensitivity to what is significant (Colombetti, 2007, p. 543). This emotional attunement helps to anchor us in the world and makes the objects and situations we encounter intelligible by virtue of the fact that they somehow matter to us. The “lived body” and its relationship to the environment thereby serve as the constitutive basis of personal significance and meaning (Nonthoff, 2008, p. 70).

Like the other structural features of emotion, intentionality is rooted in the biological dynamics of living organisms. An entity that is capable of staving off its own dissolution

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develops a concerned point of view, from which the world’s events can be partitioned into the favorable, the unfavorable, and the neutral. Physical and chemical phenomena in and of themselves have no particular significance, but only take on meaning in relation to the “natural purpose” of living organisms to maintain their identity. As self-organizing, autonomous, dynamic systems, organisms enact meaning via continuous reciprocal interaction with their environments (Thompson, 2007, p. 79). However, to say that emotions are enactive is not to say that embodied action constitutes emotional content, but rather that dynamic bodily engagement is a necessary condition of emotional consciousness. The cognitive-emotional interpretations that constitute affective appraisal are physically grounded in “organismic processes of self-regulation aimed at sustaining and enhancing adaptive autonomy in the face of perturbing environmental events” (Thompson and Stapleton, 2009, p. 27). Sense-making therefore can be understood as a “bodily cognitive-emotional form of understanding” that is present in at least a protoform in all living systems (Colombetti, 2011). Of course, among complex living organisms like us, these engagements with the environment take on an especially sophisticated form. At the level of living animals, emotion emerges as “a form or structure of comportment, a perceptual and motor attunement to the world” (Thompson, 2007, p. 80) whereby an organism shapes its world into a meaningful domain.

What I call “affective framing” is the process whereby we interpret persons, objects, facts, states of affairs, ourselves, etc., in terms of embodied desiderative feelings (i.e. feelings of caring). A frame is a cognitive short cut that people rely on in order to attend to and highlight particular features of their surroundings, and which thereby carves out the “starting points” for deliberation, thought, and other cognitive processes. The term “affective framing” is meant to capture the idea that affectivity permeates our interpretations and patterns of attention and thereby enables us to make sense of the world. It is important to note that although I am borrowing the term framing from the field of cognitive science, I am not using the term in its usual way. According to the intellectualist tradition of Plato and Descartes, thought can be treated as a kind of computation. Computer programs are algorithms, and if we are computers, then it must be possible to uncover what sort of program we are running to perform various cognitive tasks. However, if this is the case, it seems that even a relatively straightforward cognitive task like playing a game of chess presents a daunting computational challenge.

As Dreyfus (2007) understands it, the frame problem has to do with recognizing significance, “knowing which facts [are] relevant in any given situation,” and being able to identify the relevant modifications when the context or state of the world shifts (p. 248). The chess player must select, from among an astronomically large number of possible moves, the single move that brings her closer to victory (Noë, 2009, p. 104). This requires that the player form an accurate representation of the state of play, calculate the consequences of possible moves, and then select the move with the greatest strategic advantage. However, a competent player “does not face the computational problem of evaluating moves from among the potential infinity of possibilities,” given that the moves worth considering seem already to be carved out in advance (Noë, 2009, p. 105). Rather than deliberating or applying some algorithm, she selects moves partly based on what “feels right.”

In its most basic form, affective framing involves a low-level mode of appraisal that has to do with “ecological significance to the organism” and involves schematic evaluation that is spontaneous, automatic, and below the threshold of awareness (Northoff, 2008, p. 89). This primitive sort of evaluation allows the organism to appraise the environment in terms of survival and well-being, “thereby singling out what matters to and concerns the organism and what is of significance to it” (Northoff, 2008, p. 89). Affective framing in this way exemplifies the deep continuity between emotion and life, and how personal significance and value are linked to an
individual’s lived bodily dynamics. An affective frame operates as a gut-driven short cut whose interpretive focus is targeted and contoured by a creature’s embodied desires and cares. This pretheoretical, non-intellectual understanding of where to direct one’s attention in a given context is built up through learning and one’s embodied interactions with the surroundings. Built-up affective framing patterns come to constitute one’s basic “affective orientation,” which “conditions and circumscribes the kind of cognitive engagement one is able to have with the world” (Ridley, 1997, p. 174). Affect operates as the allure of consciousness, and implies a “dynamic gestalt or figure–ground structure” whereby some objects emerge into affective prominence, while others become unnoticeable (Thompson, 2007, p. 374). Allure operates prior to conceptual information processing, and yields a pre-reflective, fine-grained, caring-contoured mapping of one’s surroundings, so that one can immediately focus one’s cognitive attention. This serves to directly bias the competition for processing resources in favor of information one feels is important.

Affective framing explains how, depending on their emotional condition, subjects attend to different features of their environment and form different interpretations of their situation. Because our framing of a situation, person, or object is always infused with affect, feeling and appraisal are intrinsically linked. While the prefrontal lobe no doubt plays a crucial role, the provision of affective and motivational color or tone to events and situations is not simply a neural achievement. Affective framing is best understood as distributed over a complex network of brain and bodily processes; it engages not just neural circuitry, but also metabolic systems, endocrine responses, musculoskeletal changes, and cardiovascular responses.

**Conclusion: implications for orthodox cognitive science**

My claim that emotions are essentially embodied, enactive appraisals has important implications for artificial intelligence (AI). Much of the work being done in AI begins with the notion that it is possible to formulate “explicitly specifiable rules of thought” that govern the move from one cognitive state to another (Anderson, 2003, p. 94) and then program these rules into a computer. Early work in AI and robotics often involved robots operating in mostly static environments that to some extent had been designed specifically for them. In the real world, however, things change. To be truly “intelligent,” a robot must be able to cope and adjust its plan of action, and thus be truly dynamic and immediately sensitive to change. However, the robot should not have to replan as a result of every change to its surroundings, but instead only in response to changes that are relevant to its goals. It seems clear that this ability to detect relevance is a crucial aspect of human intelligence, but it is unclear how to get a robot to accomplish this simply by following an algorithm. Programming many thousands of facts into the computer hardly helps, since effective agency requires that the computer determine which facts are relevant to its proposed action. Even if the computer had a straightforward set of relevance rules, it is unclear that it could apply these rules successfully in any efficient way. What is relevant is constantly changing, based on the interplay between various aspects of the environment, situational factors, and the robot’s particular abilities. Changing any one factor can change the relevance of some other factor. Carried out by a computer system manipulating formal symbols, all this rule-following would take too long and would be too cognitively “expensive” (p. 97). Moreover, it seems that “in order to identify the possibly relevant facts in the current situation one would need a frame for recognizing,” but this would result in a “regress of frames for recognizing relevant frames for recognizing relevant facts” (Dreyfus, 2007, p. 248). Without an immediate, intuitive means of detecting relevance, robots could respond only to fixed features of their surroundings.

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Creatures like us seem to have some other way of recognizing and “responding directly to relevance so that the frame problem does not [ever even] arise” (Dreyfus, 2007, p. 263). Appealing to the work of Merleau-Ponty, Dreyfus proposes that the body and world are coupled in a way that allows ordinary subjects to avoid the frame problem. Human intelligence is grounded in and ultimately dependent upon a more basic way of coping, which is rooted in a feedback loop between an embodied agent and the perceptual world, and shared by many non-human animals. Experience presents the subject with more and more finely discriminated situations, on the basis of which her responses are adapted and refined. This everyday coping with the world requires that embodied beings “take as input energy from the physical universe and respond in such a way as to open them to a world organized in terms of their needs, interests, and bodily capacities” (p. 251). During such activity we are in a sense one with the world, rather than being one step removed from objects in our surroundings in order to think about them or represent them. We are engaged in a steady flow of activity, during which our body serves as a “grouping of lived-through meanings” that steers us toward some optimal body–environment relationship (Merleau-Ponty, 1962, p. 153). Our being appropriately sensitive to relevance “depends on our responding to what is significant for us given our needs, body size, [and] ways of moving,” as well as personal and cultural factors (Dreyfus, 2007, p. 265). Thus, in order to create a robot that is responsive to the significance of the environment as it shows up for human beings, our program would have to include a model of a body much like ours with similar needs, desires, interests, and ways of moving. Dreyfus asserts that supercomputers programmed with detailed descriptions of human bodies and motivations have little chance of being realized in the real world. I agree, but in my view this is because our capacity for detecting relevance is even more deeply grounded in our physical embodiment than Dreyfus describes.

As Anderson (2003) notes, the notion of “physical grounding” (p. 102) is at the core of intelligence and crucial for solving the “frame problem.” Our immediate capacity for detecting relevance and value is “physically grounded” in our bodily form, structure, and neurobiological dynamics. Living organisms interpret environmental stimuli in terms of their “vital significance,” and among animals, this is essentially constrained by bodily form, internal structure, bodily based capacities, and the way they are structurally coupled with the environment. Generally speaking, environmental stimuli take on the meaning that they do because we are self-regulating biological organisms that seek to survive in the surrounding natural and social world. No doubt detecting relevance and significance in a complex world such as ours goes well beyond mere survival and self-maintenance, and has much to do with adapting and faring well in a specific sociocultural context. Learning no doubt plays a huge role, so that over time we develop habitual patterns of bodily response and become selectively attuned to certain aspects of our surroundings.

I have suggested that detecting relevance and significance is a matter of bodily attunement and the built-up patterns of feeling and response that comprise affective framing. This is made possible by the fact that living creatures are dynamical and adaptive beings that interact with their environment through exchanges of matter and energy. Value-driven points of view emerge, orderly pattern and structure appear, and lived bodily dynamics come to exhibit certain characteristic patterns. Brain and body are interdependent and mutually regulating, and as an animal interacts with the environment, a global pattern of distributed, coherent bodily activity comes to govern its sense-making activities. Affective framing, which is rooted in neurobiological dynamics, selectively attunes living organisms to their environment and allows them to recognize which factors are relevant given their specific needs and current situational factors (Dreyfus, 2007, p. 265).
To the extent that robots fail to exhibit the dynamics of living systems, they are not self-regulating, autonomous agents, and their sense-making is not physically grounded in autopoietic and metabolic processes. Thus, there is good reason to think that they cannot have emotions like ours and are incapable of making sense of their surroundings via affective framing. This inevitably makes their ways of interpreting their surroundings very different from the sense-making that creatures like us carry out on a regular basis.

Note

1 See e.g. Damasio, 1999; and Prinz, 2004.

References